Art. VIII.—*Remarks on the Proposed Subdivision of the Eocene Rocks of Victoria.*

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Last year we contributed a paper to this Society in which, when discussing the older tertiary rocks of Maude, (1) we indicated what we believed to have been the general order of succession of the eocene rocks of Victoria. During the present year a paper by Professor Ralph Tate and Mr. J. Dennant (2) has appeared, in which our conclusions are objected to and a number of arguments are brought forward in opposition to them. The number and variety of the interpretations of the succession of the rocks in question already advanced show the difficulty of the subject, and an historical account of the various views held has been given by one of us elsewhere (3).

Before considering the objections of Messrs. Tate and Dennant it will be better perhaps to state briefly the steps by which we arrived at our conclusions. For a fuller statement of the case reference must be made to our former article (1). We recognised three horizons, characterised by differences in their fauna, and as types of these horizons we took those deposits which had been most fully elaborated, namely, Lower Muddy Creek, Waurn Ponds, and Spring Creek. We found that where the "Muddy Creek" and "Waurn Ponds types" occurred together, the latter was the underlying deposit, and that beds of the "Waurn Ponds type" in several places overlay the older volcanic rock. At Maude we found that the latter rock was underlain by a series of beds which, on palæontological grounds, we correlated with the Spring Creek beds. As a further confirmation of our view we calculated the percentage of recorded living species in the

Muddy Creek and in the Spring Creek beds and found the result to point in the same direction, namely, that the Spring Creek beds are older than those of Muddy Creek.

The force of some of the objections raised to our views by Messrs. Tate and Dennant, especially as regards the value of the polyzoal rock as a bench mark, cannot be gainsaid, but there are others which we are not at all prepared to allow. We are still of opinion that the Spring Creek series is older than the Muddy Creek one, and that the older volcanic rock is older than the Muddy Creek beds and younger than part, at any rate, of the Spring Creek series.

As a matter of convenience we shall consider Messrs. Tate and Dennant's objections in the order in which they appear in their paper.

In the first place (2, p. 116) the following sentence occurs in their paper :—"At Maude, as is well known, tertiary deposits occur both above and below a layer of basalt, which has been described by the survey as a subsequent intercalation, but this reading is disputed in the article referred to," that is, in our paper. From this passage it would, we think, naturally be concluded that the volcanic rock of this section was regarded by the officers of the survey as of more recent date than the marine beds with which it is intercalated, and that it was in opposition to their views that we regarded it as contemporaneous. In other words, it was open to doubt if it really represented the older volcanic, and that any conclusions we might draw from our view of the case were to be received with caution. But the word "subsequent" does not appear, as far as we can find, in any of the references to the section. As a matter of fact our views on this point are in complete accord with those of the survey, and it was by means of this very section that the age of the older volcanic rock was determined by Selwyn for the colony generally. What we did differ from the survey on was a very minor point. The officers state in effect that after the main flow of basalt, of about 100 feet in thickness, a period of quiescence followed, during which a thin bed of limestone was deposited. Then a thin sheet of basalt was poured out, covering the limestone and metamorphosing it, and that then the deposition of limestone and other marine beds was resumed. We hold that there is only one

sheet of basalt, and that the intercalated limestone does not exist, the appearances being due to deposition as a littoral deposit on a bouldery basalt bottom. It is evident that on the main question, the age of the volcanic rock, we are in agreement with the survey in considering it the "older basalt."

The authors then say that we placed the Spring Creek section lower than the Muddy Creek beds and some others "from its slightly lower percentage of recent species." This is however only a partial statement of our reasons for so doing. Our main reason was stratigraphical, and it was by the latter means that we arrived at our conclusion in the first place, and we took the percentage as a piece of confirmatory evidence.

In calculating our percentage for Muddy Creek we stated that "at least ten recent species are now known from these beds" (1, p. 191). Messrs. Tate and Dennant (2, p. 116) say that eight and not ten are "recorded to have living representatives." It is quite possible that the authors are not prepared to accept as correct all the recent species which are recorded from the lower beds at Muddy Creek. We went carefully through the literature once more, and find that our statement was below the mark; we should have said not ten but eleven. Of these nine are to be found recorded, both as occurring in the lower beds and as being recent species, by Messrs. Tate and Dennant. The tenth has been recorded as occurring by them and has been recorded as recent by us, while the eleventh was recorded from Muddy Creek by one of us, and is an acknowledged recent species.

We are not aware that any of these records have been publicly withdrawn or contradicted, and we give the list with some of the references.

Recorded Living Species in the Lower Beds of Muddy Creek.

	Record in Lower Beds of Muddy Creek.	Record living.
Crepidula unguiformis, Lamk.	4. p. 330	4. p. 330
Capulus danieli, Crosse	4. p. 334	4. p. 334
Hipponyx antiquatus, Linn.	4. p. 329	4. p. 329
Dentalium lacteum, Deshayes	5. p. 52 6. p. 223	5. p. 52

	Record in Lower Beds of Muddy Creek.	Record living.
Ostræa hyotis, Linn.	7. p. 49	7. p. 53
Placunanomia ione, Gray	9. p. 20	8. p. 9
Pectunculus laticostatus, Q. & G.	10. p. 16	8. p. 44
Nucula tenisoni, Pritchard	as *N. tumida* 6. p. 224 10. p. 16	as *N. grayi* 1. p. 190
Limopsis aurita, Brocchi	7. p. 50	8. p. 41
Limopsis belcheri, Ad. & R.	7. p. 50	8. p. 41
Saxicava arctica, Linn.	2. p. 113	5. p. 38

On the following page of the Correlation Paper (p. 17) Messrs. Tate and Dennant state that the number of species passing up from the eocene of Muddy Creek and of Spring Creek into younger deposits is distinctly opposed to our view of the succession. As in the last instance, however, we must take exception to the figures on which they base their calculations. They state that thirty species from Muddy Creek and sixteen from Spring Creek pass up into the miocene. Taking the published papers of Messrs. Tate and Dennant as our authorities, and counting the species recorded as miocene, or in a few cases as younger, and which also occur in the eocene beds, we find our results are widely different from those just quoted. The number of mollusca recorded as passing up from the eocene of Muddy Creek into younger deposits is not thirty but seventy-two, and in the case of Spring Creek, not sixteen but thirty-nine. These records, however, require revision, as although some of the genera have been critically examined since some of the records were made, still the probably incorrect ones have not been expunged, and some species have been recorded with doubt, owing to the imperfect condition of the specimens. In the case of two of the Spring Creek records, namely, *Chione propinqua* and *Dosinia johnstoni*, one of us has elsewhere given reasons for considering them as distinct from the miocene species, and has renamed them. When we reject the species which, after carefully considering the matter, we think should be omitted on the grounds above stated, we obtain for Muddy Creek sixty-eight, and for Spring Creek thirty-three. We are, however, met by a fresh difficulty, and that is what is the total number of molluscan species hitherto obtained

from the two localities. Messrs. Tate and Dennant say they have 649 from Muddy Creek. We believe that we have 326 from the lower beds at Spring Creek. Basing our calculations on these figures, we get about 10 per cent. passing up at Spring Creek and about 10·5 at Muddy Creek, a result which is of little value one way or the other.

We must admit that we were incorrect in grouping together the polyzoal limestones we mentioned in our paper, and that they properly should be associated with the molluscan beds and worked out by their aid. The echinoderms, brachiopods, and pectens, which constitute the bulk of the larger fossils they contain, are practically the same in the beds we specified. But when, as at Upper Maude, we have gastropods and lamellibranchs other than pectens associated with them, we are, as pointed out by Messrs. Tate and Dennant, on surer ground. Last Easter we were fortunate in finding a block of limestone in the quarry *débris* at Waurn Ponds, which contained, amongst other forms, lamellibranch casts similar to those we recorded from North Belmont, and which induced us to place the latter deposit on the same horizon as Spring Creek. Upon the evidence of the brachiopods, echinoderms and pectens we associated the Upper Maude beds with those of Waurn Ponds, but at the same time mentioned that the gastropods from the Clyde section really corresponded with those from calcareous clays overlying and interbedded with the polyzoal limestone at Batesford, and it is consequently with the latter and not with the Waurn Ponds series that the Upper Maude beds should be associated. The Batesford limestones are, it will be remembered, in turn overlain by the richly fossiliferous clays of the Southern Moorabool valley (13).

As a correct reading of the Spring Creek section has an important bearing on the whole question, we may briefly restate the opinions that have been held on the subject. Daintree, who had charge of the survey party in the district, at first recognised two divisions in the beds, the upper comprising everything as far down as the hard band, which we identify as that forming the top of Bird Rock. He distinguished them in his report as Upper and Lower Miocene (11). A short time afterwards the coralline or polyzoal limestone, which he regarded as passing over the top of the clays and sands, was separated from the lower beds, and a

triple series was thus distinguished, which was stated to show sufficient palæontological differences to justify the application of the names Upper, Middle, and Lower Miocene (12).

Subsequently Messrs. Tate and Dennant stated (6) that the polyzoal limestone merged into the upper series of clays, sands, and hard limestone bands, and that no palæontological distinction other than that caused by change of sediment existed. In their last paper (2) they have admitted that there are two zones at Spring Creek, but still refer the whole of the series to one epoch, namely, eocene.

The result of our examination of the section is to confirm the observations of Messrs. Tate and Dennant on these three points. Consequently, instead of the three subdivisions of the survey, we have only two, as their two upper divisions merge laterally.

Hitherto most of the collecting has been done in the lower zone, with the exception of echinoderms, brachiopods and a few pectens, which have been gathered from the polyzoal limestone, and from what Messrs. Tate and Dennant term the echinoderm rock. The molluscan lists and the calculations deduced from them have been founded on the material contained in the beds at or about the level of those of Bird Rock.

On our last two visits to Spring Creek we carefully searched the beds above the echinoderm rock at Fisherman's Steps and along the accessible portions of the cliffs towards Rocky Point, where similar beds overlie the limestones. As already pointed out by Messrs. Tate and Dennant, the most interesting point about the beds is the occurrence of a large percentage of forms not hitherto recorded from the section. Many of these are new, others have only been recorded from Table Cape, while some are common species at others of our eocene sections, which we have grouped with Lower Muddy Creek. It is these last that are specially of interest in considering the question of the general sequence of the Victorian beds. If the Spring Creek series occupied an intermediate position between the Lower Muddy Creek series and the miocene, we should expect the fauna of the higher of the two zones at Spring Creek to be still more closely allied to the miocene, and less so to that of the Lower Muddy Creek series than is that of the lower zone.

This, however, is not the case. The forms that now appear for the first time, or are common instead of rare as in the lower zone, are typical eocene species, which are common at such beds as Mornington. From this horizon we note eleven species recorded for the first time from Spring Creek section, which are common at Mornington, and four which, though previously recorded for the lower beds, are uncommon or even rare, while occurring frequently in what we regard as higher beds elsewhere.

A recent visit to Maude has enabled us to increase our list of species from the lower beds, and the decided affinity of the fauna to that of Spring Creek will be seen on examination of the table showing the occurrence of the fossils at Spring Creek, Muddy Creek, and Mornington.

TABLE SHOWING THE OCCURRENCE OF LOWER MAUDE FOSSILS AT OTHER LOCALITIES.

Lower Maude Fossils, with Corrections and Additions.	Spring Creek.	Lower Muddy Creek.	Mornington.
Zoantharia.			
Placotrochus elongatus, Dunc.	X	X	X
Notocyathus australis, Dunc.	X	X	X
„ excisus, Dunc.	X	X	X
Deltocyathus italicus, Ed. and H. (to replace Bathyactis discus)	X	X	-
Echinodermata.			
Eupatagus rotundus, Dunc. (to replace Maretia anomala)	X	-	-
Monostychia sp.	-	-	-
Fibularia gregata, Tate	X	-	-
Fibularia n. sp. (?)	-	-	-
Scutellina patella, Tate	X	X	X
Annelida.			
Serpula, sp.	-	-	-
Brachiopoda.			
Magasella compta, Sow.	X	X	-
Terebratulina scoulari, Tate	X	X	X
Rhynchonella squamosa, Hutton	-	X	-
Crania, sp.	-	-	-

Lower Maude Fossils, with Corrections and Additions.	Spring Creek.	Lower Muddy Creek.	Mornington.
Crustacea.			
? Lepas, sp.	X	-	-
Lamellibranchiata.			
Ostræa, sp.	-	-	-
Dimya dissimilis, Tate	X	X	X
Pecten consobrinus, Tate, var.	X	-	-
,, foulcheri, T. Wds.	X	X	X
,, eyrei, Tate	X	-	-
Hinnites corioensis, McCoy	-	X	-
Spondylus gæderopoides, McCoy	X	-	-
Limopsis insolita, Sow.	X	-	-
,, belcheri, Ad. and R.	X	X	X
Pectunculus cainozoicus, T. Wds.	X	X	-
Cucullæa corioensis, McCoy	X	X	X
Trigonia tatei, Pritchard	-	-	-
Cardita maudensis, Pritchard	-	-	-
Carditella, n. sp.	X	-	-
Cardium pseudomagnum, McCoy	X	-	-
Lucina leucomomorpha, Tate	X	X	-
Dosinia densilineata, Pritchard	X	-	-
Mactra, n. sp.	-	-	-
Diplodonta, n. sp.	-	-	-
Chama lamellifera, T. Wds.	X	X	X
Myadora tenuilirata, Tate	X	X	X
Corbula ephamilla, Tate	X	X	X
,, pyxidata, Tate	X	-	X
Gastropoda.			
Turritella conspicabilis, Tate	X	-	-
,, gemmulata, Tate	X	X	-
,, sp.	X	-	-
Mathilda transenna, T. Wds.	X	X	-
Natica wintlei, T. Wds.	X	-	-
Tenagodes occlusus, T. Wds.	X	X	X
Odostomia, sp.	-	-	-
Rissoina, sp.	-	-	-
Tinostoma, sp.	-	-	-
Solariella, sp.	-	-	-
Cylichna exigua, T. Wds.	X	X	-
,, sp.	X	-	-
Scutus, n. sp.	-	-	-
Scaphopoda.			
Entalis subfissura, Tate	X	X	X
Pisces.			
Otoliths	-	-	-

Of the thirty-seven species of Mollusca enumerated, twenty-six are described; of these, twenty-three occur at Spring Creek, fifteen at Muddy Creek, and ten at Mornington, while three additional undescribed species occur at Spring Creek, and do not, as far as we are aware, occur at either Muddy Creek or Mornington.

Additions and corrections to the list of species from Waurn Ponds (1, p. 184):—

Notocyathus australis, Dunc.
Deltocyathus italicus, Ed. and H.
Eupatagus murrayensis, Laube, instead of E. murrayanus.
Eupatagus rotundus, Dunc.
Cassidulus florescens, Gregory, instead of Echinobrissus, n. sp.
Terebratulina lenticularis, Tate.
Terebratulina davidsoni, R. Eth., jun.
Placunanomia sella, Tate, instead of P. ione, Gray.
Pecten consobrinus, Tate, var., instead of P. subbifrons, Tate.
Pecten eyrei, Tate, instead of n. sp.
Pecten peroni, Tate.
Hinnites corioensis, McCoy.
Limatula jeffreysiana, Tate.
Nucula tenisoni?, Pritchard.
Leda apiculata, Tate.
Pectunculus cainozoicus, T. Wds.
Trigonia semiundulata, McCoy.
Cardita polynema?, Tate.
Chione halli, Pritchard.
Chione cainozoica, T. Wds.
Dosinia densilineata, Pritchard.
Mactra howchiniana, Tate.
Natica wintlei?, T. Wds.
Turritella conspicabilis?, Tate.
Voluta halli, Pritchard.
Entalis mantelli, Zittel.
Pleurotoma, sp.

This brings the Waurn Ponds list up to seventy-two species.

Revised and extended list of fossils from the limestone of Batesford (see 13, p. 18):—

Placotrochus deltoideus, Dunc.

Placotrochus elongatus, Dunc.
Flabellum gambierense, Dunc.
Isis, sp.
Chelæ of crustacea.
Cidaroid plates and spines.
*Psammechinus woodsii, Laube.
Scutellina patella, Tate.
Clypeaster gippslandicus, McCoy.
Monostychia australis, Laube.
Pericosmus gigas, McCoy.
Pericosmus, sp.
Waldheimia garibaldiana, Davidson.
*Waldheimia divaricata, Tate.
*Waldheimia macleani, Tate.
Waldheimia furcata, Tate.
Terebratula vitreoides, T. Wds.
Terebratulina davidsoni, R. Eth., jun.
*Terebratulina scoulari, Tate.
Magasella compta, Sow.
Rhynchonella squamosa, Hutton.
*Crania quadrangularis, Tate.
Ostræa, sp.
Pecten murrayanus, Tate.
Pecten polymorphoides, Zittel.
Pecten consobrinus, Tate, var. replaces P. subbifrons, Tate.
Pecten, sp.
Limatula jeffreysiana, Tate.
Spondylus pseudoradula, McCoy.
Septifer fenestratus, Tate.
Pectunculus cainozoicus, T. Wds.
Nucula, sp.
Dosinia densilineata, Pritchard.
Mactra howchiniana, Tate.
Tenagodes, sp.
*Patella, n. sp.
Casts of trochoid shells.
Lamna, sp.
*Vertebral epiphyses, probably of a whale.

Those marked by an asterisk were collected by Mr. J. Mulder.

List of Fossils from the clay bed in the upper part of the Batesford limestone :—

Placotrochus deltoideus, Dunc.
Placotrochus elongatus, Dunc.
Flabellum gambierense, Dunc.
Notocyathus excisus, Dunc.
Notocyathus viola, Dunc.
Notocyathus australis, Dunc.
Deltocyathus italicus, Ed. and H.
Rhynchonella squamosa, Hutton.
Crania, n. sp.
Limopsis belcheri, Ad. and R.
Limopsis aurita, Brocchi.
Cucullæa corioensis, McCoy.
Crassatella dennanti, Tate.
Cardita delicatula, Tate.
Corbula ephamilla, Tate.
Typhis laciniatus, Tate.
Murex lophoessus, Tate.
Murex velificus, Tate.
Murex asperulus, Tate.
Ricinula purpuroides, Johnston.
Ranella prattii, T. Wds.
Triton woodsii, Tate.
Nassa tatei, T. Wds.
Voluta hannafordi, McCoy.
Mitra othone, T. Wds.
Marginella propinqua, Tate.
Marginella micula, Tate.
Ancillaria semilævis, T. Wds.
Genotia angustifrons, Tate.
Pleurotomidæ, five species.
Conus acrotholoides, Tate.
Conus extenuatus, Tate.
Conus dennanti, Tate.
Trivia avellanoides, McCoy.
Cassidaria gradata, Tate.
Natica polita, T. Wds.

Natica hamiltonensis, T. Wds.
Natica substolida, Tate.
Natica (Sigaretopsis) subinfundibulum, Tate.
Turritella platyspira, T. Wds.
Thylacodes conohelix, T. Wds.
Eulima danæ, T. Wds.
Cerithium crebarioides, T. Wds.
Astralium johnstoni ?, Pritchard.
Trochidæ, 7 species.
Entalis subfissura, Tate.
Entalis mantelli, Zittel.

Limestone Fossils from Spring Creek.

Those marked with an asterisk were obtained from the limestones near the mouth of Spring Creek only ; those without any indicating mark from the limestone at Rocky Point and its continuation to Fisherman's Steps. Those with a dagger are common to both limestones.

Graphularia senescens, Tate.
Holaster australiæ, Duncan.
Eupatagus laubei, Dunc.
,, rotundus, Dunc.
†Lovenia forbesii, Woods and Dunc.
Cassidulus florescens, Gregory.
Monostychia australis, Laube.
Fibularia gregata, Tate.
†Scutellina patella, Tate.
*Echinobrissus vincentianus, Tate.
†Cyclaster archeri, T. Wds.
*Linthia ? sp.
Psammechinus woodsi, Laube.
Paradoxechinus novus, Laube.
Antedon, sp.
*Waldheimia divaricata, Tate.
,, insolita, Tate.
†Magasella compta, G. B. Sow.
†Terebratulina davidsoni, R. Eth., jun.
†Terebratella woodsi, Tate.

Anomia, sp.
Dimya sigillata, Tate.
*Pecten foulcheri, T. Wds.
„ polymorphoides, Zittel.
„ n. sp. ? aff. eyrei.
Limatula crebresquamata, Tate m.s.
*Patella, n. sp.
Gastropod casts at Rocky Point.

Fossils from the Upper Clays at Spring Creek.

Those marked with an asterisk are common at Mornington and other similar beds, but not hitherto recorded from the lower zone at Spring Creek. Those marked with a dagger are common in the upper zone and at Mornington, etc., but though recorded from the lower zone are far from common.

Placotrochus deltoideus, Dunc.
Flabellum distinctum, Ed. and H.
Flabellum duncani, T. Wds.
Flabellum, sp.
Bathyactis discus, T. Wds.
Graphularia senescens, Tate.
Waldheimia insolita, Tate.
Waldheimia divaricata, Tate.
Dimya dissimilis, Tate.
Dimya sigillata, Tate.
Pecten hochstetteri, Zittel.
Pecten murrayanus, Tate.
Pecten foulcheri, T. Wds.
Pecten consobrinus, Tate, var.
Pecten eyrei, Tate.
Pecten peroni, Tate.
Limatula crebresquamata, Tate, m.s.
Spondylus gæderopoides, McCoy.
*Spondylus pseudoradula, McCoy.
Modiola, sp.
Nucula tenisoni, Pritchard.
Nucula atkinsoni, Johnston.
Leda crebrecostata, T. Wds.

Leda apiculata, Tate.
Leda, n. sp.
Limopsis insolita, G. B. Sow.
Limopsis belcheri, Ad. and R.
Limopsis multiradiata, Tate.
Pectunculus cainozoicus, T. Wds.
Pectunculus laticostatus, Q. and G.
Fossularca, n. sp.
Cucullæa corioensis, McCoy.
Trigonia semiundulata, McCoy.
Crassatella halli, Tate m.s.
Cardita polynema, Tate.
Cardita delicatula, Tate.
Cardita, n. sp.
Carditella lamellata, ? Tate.
†Chama lamellifera, T. Wds.
Cardium pseudomagnum, McCoy.
*Cardium antisemigranulatum, McCoy.
Chione halli, Pritchard.
Chione pritchardi, Tate, m.s.
Chione cainozoica, T. Wds.
Chione, sp.
Dosinia densilineata, Pritchard.
Myochama trapezia, Pritchard.
†Corbula ephamilla, Tate.
Corbula pyxidata, Tate.
Solecurtus ellipticus, Tate.
*Typhis evaricosus, Tate.
Typhis maccoyi, T. Wds.
Muricidea, sp.
Triton tortirostris, Tate.
Ricinula purpuroides, Johnston.
Latirofusus, sp.
Clavella, n. sp.
Peristernia semiundulata, Pritchard.
Voluta anticingulata, McCoy, var. persulcata.
Voluta halli, Pritchard.
Voluta stephensi, Johnston.
*Mitra othone, T. Wds.

Mitra, n. spp., 2.
Marginella propinqua, Tate.
*Marginella micula, Tate.
Oliva adelaidæ, Tate.
Ancillaria pseudaustralis, Tate.
*Ancillaria hebera, Hutton.
Ancillaria ligata, Tate.
Ancillaria, sp. n.
*Columbella clathrata, Tate, m.s.
Columbella, n. sp.
Cancellaria etheridgei, Johnston.
Pleurotoma paracantha, T. Wds.
Pleurotoma, n. spp., 2.
Genotia fontinalis, Tate.
Raphitoma columbelloides, T. Wds.
Borsonia, sp. n.
Pleurotomidæ, 9 spp.
Conus extenuatus, Tate.
Cypræa leptorhyncha, McCoy.
†Erato australis, Tate.
*Erato minor, Tate.
Natica wintlei, T. Wds.
Natica vixumbilicata, T. Wds.
Scalaria mariæ, Tate.
Scalaria, sp. n.
Turritella septifraga, Tate.
Turritella conspicabilis, Tate.
Turritella warburtoni, T. Wds.
*Turritella acricula, Tate.
*Turritella acricula, Tate, var.
Turritella aldingæ, Tate.
Syrnola, n. sp.
*Liotia roblini, Johnston. (Recorded by Messrs. Tate and Dennant).
Calliostoma, 2 spp.
Cylichna, sp.
Entalis mantelli, Zittel.
Entalis subfissura, Tate.
†Dentalium aratum, Tate.

Aturia australis, McCoy.
Sepia, n. sp.

Of the 105 species of mollusca in the above list sixty-seven are known from the lower beds, while thirty-eight are not previously recorded from Spring Creek. Of the latter, fifteen are apparently new species, and as far as we are aware are not known elsewhere. Of the remainder which are specifically known eleven are common at Mornington and in deposits at several other places which we have associated with it. Six occur at Aldinga, five at Table Cape, and one at River Murray cliffs.

Summary.

In our previous paper we undoubtedly attached too much importance to the polyzoal limestones, and incorrectly grouped together some which, as shown by the associated mollusca, should be placed on different horizons. Thus far we admit the force of the objections raised by Messrs. Tate and Dennant.

In default of molluscan fauna the position of most of the polyzoal rocks we mentioned is at present doubtful, but the Waurn Ponds and North Belmont limestones should be associated with the Spring Creek beds, while those at Upper Maude and Batesford are closely allied, and should be referred together to the Southern Moorabool Valley beds, which we have grouped with those of Lower Muddy Creek.

The fact that the upper of the two zones at Spring Creek is more nearly allied to the Muddy Creek beds than is the lower is another piece of evidence, the importance of which cannot be overlooked.

We are unable to accept as correct the figures on which Messrs. Tate and Dennant base the calculations adverse to our view of the succession of the beds.

On the main point in our earlier paper, namely, the relative position of the Spring Creek, Muddy Creek, and older volcanic rocks, our views are unchanged, and are based in part on the faunal agreement of the Lower Maude beds with those of Spring Creek, and in part on a comparison of the fossils of the two Spring Creek zones with those of other deposits.

LITERATURE.

1. The Older Tertiaries of Maude, with an Indication of the Sequence of the Eocene Rocks of Victoria, by T. S. Hall and G. B. Pritchard. Proceedings of the Royal Society of Victoria, 1894.

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